# LWR - HEADLIGHT BEAM THROW CONTROL

OVERVIEW

LWR automatically adjusts the vertical positioning of the headlights to maintain optimum headlight beam positioning for maximum driving visibility and to prevent undue glare for oncoming motorists. The system compensates for vehicle load angle changes (ie: diminishing reserve of gasoline in fuel tank during a long journey, overloaded cargo weight, etc.)

LWR has been available on BMW vehicles in other markets for quite some time. Starting with the 1999 model year all US market vehicles with Xenon Lights incorporate LWR as standard equipment. LWR is not available with standard halogen headlights.

LWR monitors the vehicle's loaded angle via two hall effect sensors mounted to the front and rear suspension members. When an adjustment is necessary, LWR simultaneously activates two stepper motors (one in each headlight assembly).

The stepper motors drive a threaded rod that moves the lower edge of the headlight carrier plate forward and backward (depending on driven direction). The upper edge of the headlight carrier plate is fixed on a pivot. The pivoting movement adjusts the vertical position of the headlight beam.

NORMALLY LOADED VEHICLE
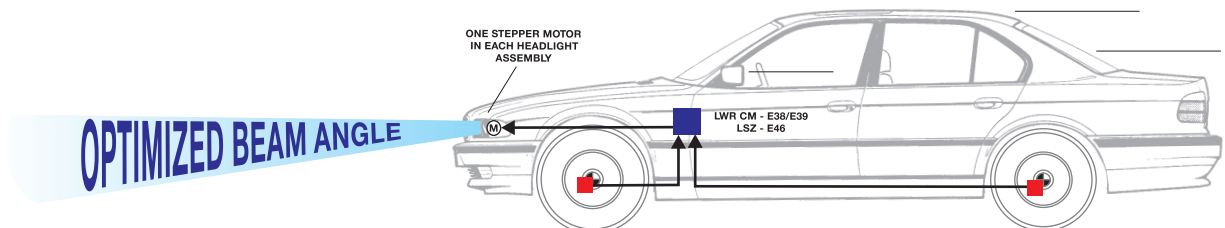

OVERLOADED VEHICLE (EXAGGERATED)
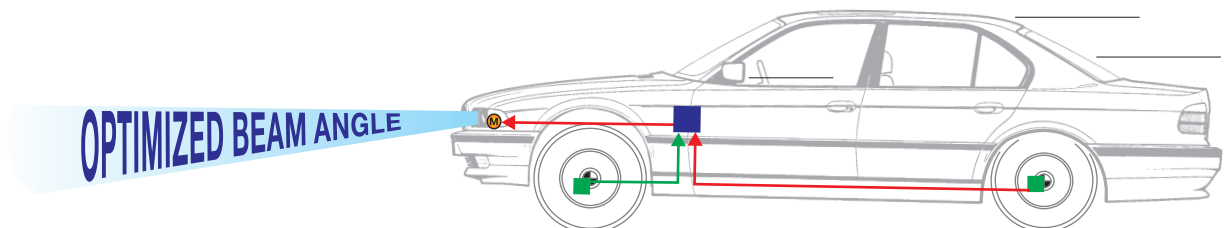
LWR COMPONENTS

CONTROL ELECTRONICS

LWR Control Module - E38 & E39 Vehicles:

The LWR control module is located in the electronics carrier forward of the glovebox. The control module connects to a single, 26 pin, yellow harness connector. The control module has diagnostic capabilities and communicates with the DIS/MoDiC via the K bus - IKE gateway to the D bus.
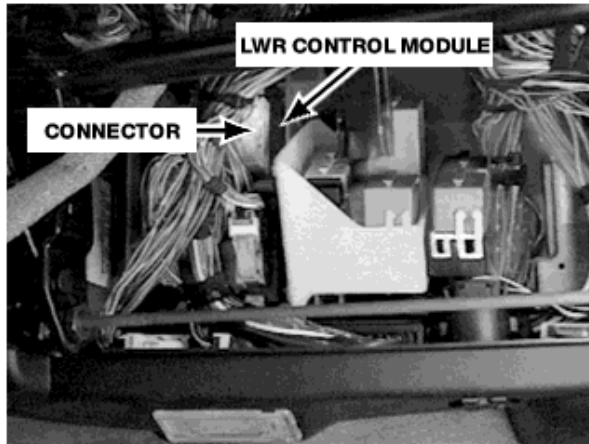
**E38 LWR Control Module Location**
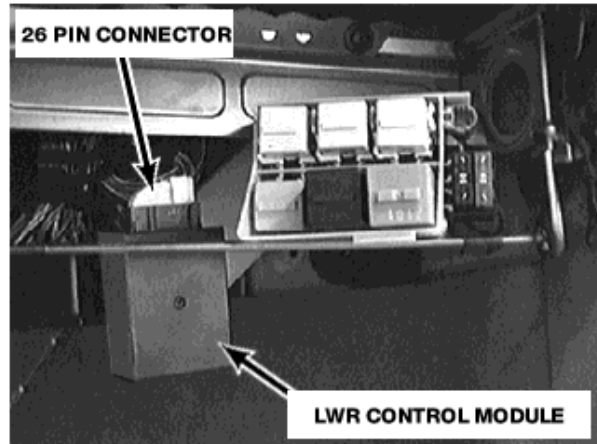
E39 LWR Control Module Location

LSZ - E46

The E46 LWR function is integrated into the control electronics of the LSZ. The LSZ monitors the required input signals to provide the LWR function and directly activates the stepper motors in the headlight assemblies. All LWR diagnosis is accessed through the LSZ control module.

LEVEL SENSORS

LWR monitors two hall effect level sensors to determine vehicle load angle. The sensors are mounted to a fixed point on the suspension carriers of the front and rear axles.

A lever is connected to the moving suspension member which changes the sensors output linear voltage signal as the suspension moves up and down.
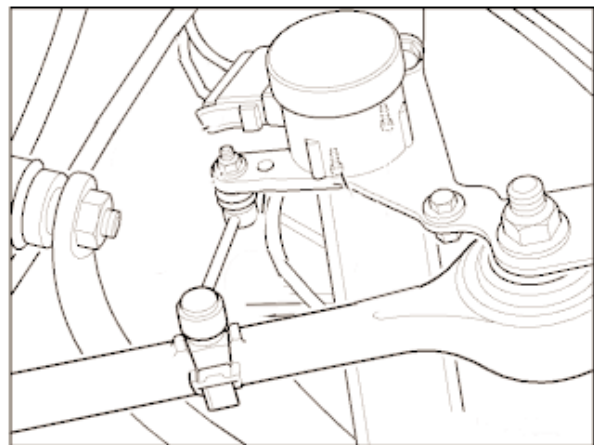

Note: E39 sport wagon vehicles with EHC have a dual output sensor at the right rear location. This sensor shares the same housing as the EHC systems right rear level sensor.

HEADLIGHT ADJUSTMENT STEPPER MOTORS

One stepper motor is located inside each headlight assembly.

The 4 wire stepper motors are controlled by the LWR control electronics to change the vertical headlight position.
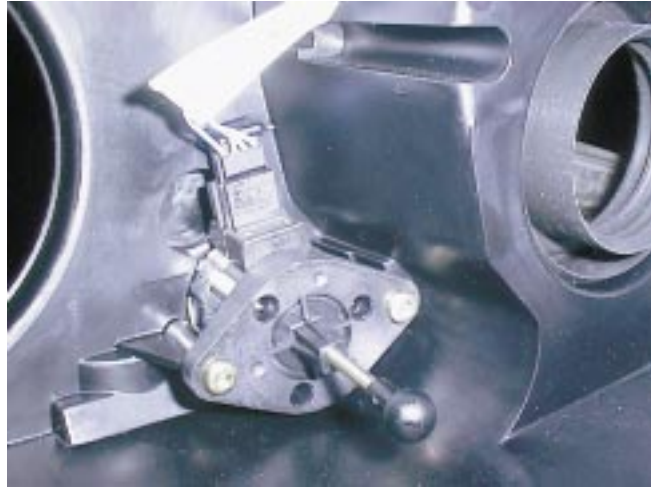
FUNCTIONAL DESCRIPTION

The E46 LWR system comes on-line when the ignition switch is turned to KL 15. The E38/E39 system comes on-line when the lights are switched on.

The LWR control electronics then cycles the stepper motors through their full range of motion and stops at a default position.

The control electronics monitors the level sensor input signals to determine the vehicles load angle and adjusts the beam position accordingly. As the vehicle is driven it continually monitors the level sensor signals and if necessary updates the headlight beam positions every 25 seconds on the E46 or momentarily on the E38/E39 system.

Abrupt fluctuations of the sensor signals are filtered to prevent unnecessary adjustment as well as monitoring road speed and brake pedal application as correction factors.

HEADLIGHT ALIGNMENT

The procedure for aligning Xenon Headlights with LWR is the same as conventional halogen bulb systems with one additional step. Wait at least 30 seconds for the LWR to cycle and adjust to it's calculated position.

LWR DIAGNOSIS

The LWR control module of the E38/E39 is diagnosible using the DIS/MoDiC. The headlights must be switched on in order to start diagnosis.

The E46 LSZ incorporates LWR diagnosis program.

LWR SYSTEM IPO SCHEMATICS

FRONT AXLE LEVEL SENSOR

REAR AXLE LEVEL SENSOR

**E46 LSZ
(LWR FUNCTION)**

LEFT HEADLIGHT STEPPER MOTOR

RIGHT HEADLIGHT STEPPER MOTOR

LCM III

LIGHTS ON POWER

DIS & MoDiC

FRONT AXLE LEVEL SENSOR

K BUS

REAR AXLE LEVEL SENSOR

**E38
E39
LWR
CM**

DSC III
5.7

PROCESSED RIGHT FRONT WHEEL SPEED SIGNAL

ELECTRONIC BRAKE LIGHT SWITCH

TO LCM

LEFT HEADLIGHT STEPPER MOTOR

RIGHT HEADLIGHT STEPPER MOTOR